



Burien

Washington, USA

400 SW 152nd Street, Suite 300 Burien, WA 98166 Phone: (206) 241-4647 • FAX: (206) 248-5539 www.burienwa.gov

2012 RESIDENTIAL ENERGY CODE PRESCRIPTIVE COMPLIANCE FORM

(Please submit 2 copies)

2012 WSEC & IRC Ventilation (Effective July 1, 2013)

Residential Prescriptive Compliance Form

This set of forms has been developed to assist permit applicants documenting compliance with the 2012 Washington State Energy Code. The following forms provide much of the required documentation for plan review. The details noted here must also be shown on the drawings.

PRESCRIPTIVE ENERGY CODE COMPLIANCE FOR CLIMATE ZONE MARINE 4

Component	Fenestration ¹		Ceiling w/ Attic	Vaulted Ceiling	Wood Framed Wall (Int.) ²	Mass Wall (Above grade)	Below-Grade Wall ^{2,3}	Framed Floor	Slab R-Value & Depth
	Vertical	Overhead							
Prescriptive Value	U. 0.30 max.	U. 0.50 max.	R-49 min.	R-38 min.	R-21 min.	R-21 min.	R- 10/15/21 Int. + TB	R-30 min.	R-10 min. 2'

¹ Fenestration is defined as skylights, roof windows, vertical windows (fixed or moveable), opaque doors, glazed doors, glazed block and combination opaque/glazed doors. Fenestration includes products with glass and non-glass glazing materials.

² Int. (intermediate framing) denotes standard framing 16" o.c. with headers insulated with a minimum R-10 insulation.

³ 10/15/21 +TB" means R-10 continuous insulation on the exterior of the wall, or R-15 on the continuous insulation on the interior of the wall, or R-21 cavity insulation plus a thermal break between the slab and the basement wall at the interior of the basement wall. "10/15/21 +TB" shall be permitted to be met with R-13 cavity insulation on the interior of the basement wall plus R-5 continuous insulation on the interior or exterior of the wall. "TB" means thermal break between floor slab and basement wall.

Radiant Slab:

☐ R-10 foam insulation, continuous with thermal break (WAC 51-11R Table R402.1.1 Footnote d)

Lighting Efficiency:

☐ 1. A minimum of 75 percent of permanently installed lamps in lighting fixtures will be high efficacy. (WAC 51-11R- R404.1)

Whole House Ventilation (Prescriptive)

Please check the appropriate box to describe which of the four prescriptive Whole House Ventilation Systems you will be using.

- ☐ 1. Intermittent Whole House Ventilation Using Exhaust Fans & Fresh Air Inlets. (IRC M1507.3.4)
- ☐ 2. Intermittent Whole House Ventilation Integrated with a Forced Air System. (IRC M1507.3.5)
- ☐ 3. Intermittent Whole House Ventilation using a Supply Fan. (IRC M1507.3.6)
- ☐ 4. Intermittent Whole House Ventilation Using a Heat Recovery Ventilation System (IRC M1507.3.7)

Source Specific Exhaust Ventilation & Fan Efficiency

Required in each kitchen, bathroom, water closet compartment, laundry room, indoor swimming pool, spa and other rooms where water vapor or cooking odor is produced. (IRC M 1507.4) Fan efficiency from WAC 51-11R – Table R403.5.1

Minimum Source Specific Ventilation Capacity Requirements


	Bathrooms – Utility Rooms		Kitchens	In-line fan
Intermittently operating	50 cfm		100 cfm	
Continuous operation	20 cfm		25 cfm	
Air Flow Rate Minimum (cfm)	10	90	Any	Any
Minimum Efficacy (cfm/watt)	1.4 cfm/watt	2.8 cfm/watt	2.8 cfm/watt	2.8 cfm/watt
Air Flow Rate Maximum (cfm)	> 90	Any	Any	Any

Energy Efficiency Credits

Each dwelling unit shall comply with sufficient options from Table R406.2 so as to achieve the following minimum number of credits as described on the reverse side of this page.

- ☐ 1. **Small Dwelling Unit: 0.5 points** (Dwelling units less than 1500 SF in conditioned floor area with less than 300 square feet of fenestration area. Additions of 750 SF or less heated floor area to existing building.
- ☐ 2. **Medium Dwelling Unit: 1.5 points** (All dwelling units 1500 – 5000 SF, including additions over 750 SF.
- ☐ 3. **Large Dwelling Unit: 2.5 points** (Dwelling Units exceeding 5000 SF of conditioned floor area.

TABLE 406.2 ENERGY CREDITS

Please circle the option to be used and fill in the applicable credits. Show total number of credits.		Credit	
Opt	Description	Value	Selection
1a	EFFICIENT BUILDING ENVELOPE 1a: Prescriptive compliance is based on Table R402.1.1 with the following modifications: Fenestration U = 0.28, Floor R-38, Slab on grade R-10 perimeter and under entire slab, Below grade slab R-10 perimeter and under entire slab, or Compliance based on Section R402.1.4: Reduce the Total UA by 5%.	0.5	
1b	EFFICIENT BUILDING ENVELOPE 1b: Prescriptive compliance is based on Table R402.1.1 with the following modifications: Fenestration U = 0.25, Wall R-21 plus R-4, Floor R-38, Basement wall R-21 int plus R-5 ci, Slab on grade R-10 perimeter and under entire slab, Below grade slab R-10 perimeter and under entire slab, or Compliance based on Section R402.1.4: Reduce the Total UA by 15%.	1.0	
1c	EFFICIENT BUILDING ENVELOPE 1c: Prescriptive compliance is based on Table R402.1.1 with the following modifications: Fenestration U = 0.22, Ceiling and single-rafter or joist-vaulted R-49 advanced, Wood frame wall R-21 int plus R-12 ci, Floor R-38, Basement wall R-21 int plus R-12 ci, Slab on grade R-10 perimeter and under entire slab, Below grade slab R-10 perimeter and under entire slab, or Compliance based on Section R402.1.4: Reduce the Total UA by 30%.	2.0	
2a	AIR LEAKAGE CONTROL AND EFFICIENT VENTILATION 2a: Compliance based on R402.4.1.2: Reduce the tested air leakage to 4.0 air changes per hour maximum <u>and</u> All whole house ventilation requirements as determined by Section M1507.3 of the International Residential Code shall be met with a high efficiency fan (maximum 0.35 watts/cfm), not interlocked with the furnace fan ventilation systems using a furnace including an ECM motor are allowed, provided that they are controlled to operate at low speed in ventilation only mode. <u>To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the maximum tested building air leakage and shall show the heat recovery ventilation system.</u>	0.5	
2b	AIR LEAKAGE CONTROL AND EFFICIENT VENTILATION 2b: Compliance based on Section R402.4.1.2: Reduce the tested air leakage to 2.0 air changes per hour maximum <u>and</u> All whole house ventilation requirements as determined by Section M1507.3 of the International Residential Code shall be met with a heat recovery ventilation system with minimum sensible heat recovery efficiency of 0.70. <u>To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the maximum tested building air leakage and shall show the heat recovery ventilation system.</u>	1.0	
2c	AIR LEAKAGE CONTROL AND EFFICIENT VENTILATION 2c: Compliance based on Section R402.4.1.2: Reduce the tested air leakage to 1.5 air changes per hour maximum <u>and</u> All whole house ventilation requirements as determined by Section M1507.3 of the International Residential Code shall be met with a heat recovery ventilation system with minimum sensible heat recovery efficiency of 0.85. <u>To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the maximum tested building air leakage and shall show the heat recovery ventilation system.</u>	1.5	
3a	HIGH EFFICIENCY HVAC EQUIPMENT 3a: Gas, propane or oil-fired furnace with minimum AFUE of 95%. <u>To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the heating equipment type and the minimum equipment efficiency.</u>	0.5	
3b	HIGH EFFICIENCY HVAC EQUIPMENT 3b: Air-source heat pump with minimum HSPF of 8.5. <u>To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the heating equipment type and the minimum equipment efficiency.</u>	1.0	
3c	HIGH EFFICIENCY HVAC EQUIPMENT 3c: Closed-loop ground source heat pump; with a minimum COP of 3.3 <u>or</u> Open loop water source heat pump with a maximum pumping hydraulic head of 150 feet and minimum COP of 3.6. <u>To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the heating equipment type and the minimum equipment efficiency.</u>	2.0	
3d	HIGH EFFICIENCY HVAC EQUIPMENT 3d: DUCTLESS SPLIT SYSTEM HEAT PUMPS, ZONAL CONTROL: In homes where the primary space heating system is zonal electric heating, a ductless heat pump system shall be installed and provide heating to at least one zone of the housing unit. <u>To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the heating equipment type and the minimum equipment efficiency.</u>	1.0	
4	HIGH EFFICIENCY HVAC DISTRIBUTION SYSTEM: All heating and cooling system components installed inside the conditioned space. All combustion equipment shall be direct vent or sealed combustion. Locating system components in conditioned crawl spaces is not permitted under this option. Electric resistance heat is not permitted under this option. Direct combustion heating equipment with AFUE less than 80% is not permitted under this option. <u>To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the heating equipment type and shall show the location of the heating and cooling equipment and all the ductwork.</u>	1.0	
5a	EFFICIENT WATER HEATING 5a: Water heating system shall include one of the following: Gas, propane or oil water heater with a minimum EF of 0.62 or Electric water heater with a minimum EF of 0.93. and for both cases All showerhead and kitchen sink faucets installed in the house shall be rated at 1.75 GPM or less. All other lavatory faucets shall be rated at 1.0 GPM or less. <u>To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the water heater equipment type and the minimum equipment efficiency and shall specify the maximum flow rates for all showerheads, kitchen sink faucets, and other lavatory faucets.</u>	0.5	
5b	EFFICIENT WATER HEATING 5b: Water heating system shall include one of the following: Gas, propane or oil water heater with a minimum EF of 0.82 or Solar water heating supplementing a minimum standard water heater. Solar water heating will provide a rated minimum savings of 85 therms or 2000 kWh based on the Solar Rating and Certification Corporation (SRCC) Annual Performance of OG-300 Certified Solar Water Heating Systems or Electric heat pump water heater with a minimum EF of 2.0 and meeting the standards of NEEA's Northern Climate Specifications for Heat Pump Water Heaters or Water heater heated by ground source heat pump meeting the requirements of Option 3c. <u>To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the water heater equipment type and the minimum equipment efficiency and, for solar water heating systems, the calculation of the minimum energy savings.</u>	1.5	
6	RENEWABLE ELECTRIC ENERGY: For each 1200 kWh of electrical generation provided annually by on-site wind or solar equipment a 0.5 credit shall be allowed, up to 3 credits. Generation shall be calculated as follows: For solar electric systems, the design shall be demonstrated to meet this requirement using the National Renewable Energy Laboratory calculator PVWATTS. Documentation noting solar access shall be included on the plans. For wind generation projects designs shall document annual power generation based on the following factors: The wind turbine power curve; average annual wind speed at the site; frequency distribution of the wind speed at the site and height of the tower. <u>To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall show the photovoltaic or wind turbine equipment type, provide documentation of solar and wind access, and include a calculation of the minimum annual energy power production.</u>	0.5	
See table R406.2 for footnotes		TOTAL CREDITS FOR THIS PROJECT 	

R402.3.3 Glazing Exception (15 SF Max.)

[illegible]

Simple Heating System Size (Electronic version available at: http://www.energy.wsu.edu/Documents/Heat_Sizing_code%20specs_final.xlsx)**HEATING SYSTEM TYPE**☐ Forced Air Furnace☐ Heat Pump**DESIGN TEMPERATURE (Burien)**

46

AREA OF BUILDING

Conditioned Floor Area

Average ceiling height

Conditioned Volume (Area x Average Height)

GLAZING AND DOORS**U Factor****X****Area****=****UA**

Default

0.30

INSULATION

Attic

U-Factor**X****Area****=****UA**

R-49

0.026

R-38 Advanced

0.026

Single Rafter or Joist Vaulted Ceilings

U-Factor**X****Area****=**

R-38 Vented

0.027

Above Grade Walls

U-Factor**X****Area****=**

R-21

0.056

R-21 (+R-5 CI)

0.044

Floors

U-Factor**X****Area****=**

R-30

0.029

Below Grade Walls

U-Factor**X****Area****=****UA**

R-21 Interior

U-0.042

R-10 Exterior CI)

U-0.064

Slab Below Grade

F-factor**X****Length****=****UA**

R-5 TB at edge

0.57

Slab on Grade

F-factor**X****Length****=****UA**

R-10 2' perimeter

0.54

R-10 Fully Insulated

0.36

LOCATION OF DUCTS**Duct leakage coefficient**

Conditioned Space

1

Unconditioned Space

1.1

Sum of UA

Envelope Heat Load

Sum of UA X Design Temperature Difference

Air Leakage Heat Load

((Volume X 0.6) X Design Temp) X .018))

Building Design Heat Load

Air Leakage + Envelope Heat Loss

Building and Duct Heat Load

If ducts are located in unconditioned space: Sum of Building Heat Loss X 1.10

If ducts are located in conditioned space: Sum of Building Heat Loss X 1

Maximum Heat Equipment Output

Building and Duct Heat Loss X 1.40 for Forced Air Furnace

Building and Duct Heat Loss X 1.25 for Heat Pump

Energy Code Support



Duct Testing Standard (RS-33) For New and Existing Construction

New Construction

Based on the protocol for "Total Leakage Testing," or "Leakage Testing to Outdoors" duct leakage in new construction shall not exceed $0.04 \text{ CFM}_{25} \times \text{floor area}$ (in square feet) served by the system for leakage to outdoors or for total leakage when tested post construction. When testing at rough-in, targets should not exceed $0.04 \text{ CFM}_{25} \times \text{floor area}$ (in square feet) for total leakage or $0.03 \text{ CFM}_{25} \times \text{floor area}$ (in square feet) if the air handler is not installed.

Exception: The total leakage test is not required for ducts and air handlers located entirely within the building thermal envelope. Ducts located in crawl spaces do not qualify for this exception.

Existing Construction

When a space-conditioning system is altered by the installation or replacement of space-conditioning equipment (including replacement of the air handler, outdoor condensing unit of a split system air conditioner or heat pump, cooling or heating coil, or the furnace heat exchanger), the duct system that is connected to the new or replacement space-conditioning equipment shall be tested. The test results shall be provided to the building official and the homeowner.

Exception 1: Duct systems that are documented to have been previously sealed as confirmed through field verification and diagnostic testing in accordance with procedures in RS-33.

Exception 2: Ducts with less than 40 linear feet in unconditioned spaces.

Exception 3: Existing duct systems constructed, insulated or sealed with asbestos.

Exception 4: Additions of less than 750 square feet of conditioned floor area.

In addition, the following requirements must be met:

1. All testing must be done by a qualified technician. The minimum qualification requirement is documented attendance at a duct testing training course approved by the building official. The following existing training programs are recognized as equivalent to this requirement:
 - a. Northwest ENERGY STAR Homes Program, Performance Testing training for new construction.
 - b. Performance Tested Comfort Systems (PTCS) training for existing homes and new construction.
 2. Duct systems must be designed, sized, and installed using recognized industry standards and International Residential Code (IRC) requirements, so that calculated heating and/or cooling loads are delivered to each zone.
-

Total Duct Leakage Test

Testing Procedure Application:

This test is appropriate in new construction when ducts are to be tested at the rough-in stage before the house envelope is intact and can also be done post construction. The test measures the total collected leaks in the system at an induced pressure of 25 Pascals (PA). Compared to the leakage to exterior test, the total leakage test is simpler, but does not discriminate between leakage to inside and outside the heated space; as such, this test is not recommended for homes with complete house envelopes and HVAC systems. In such cases, the leakage to outside test is recommended.

Standard:

- 1) For certification, the measured duct leakage must not exceed **$0.04 \text{ CFM}_{25} \times \text{floor area}$** (in square feet) served by the system at rough-in **when the air handler is installed**.
 - 2) The measured duct leakage at rough-in must not exceed **$0.03 \text{ CFM}_{25} \times \text{floor area}$** (in square feet) served by the system **when the air handler is not installed**.
 - 3) If testing post construction, the total leakage must not exceed **$0.04 \text{ CFM}_{25} \times \text{floor area}$** (in square feet) served by the system.
-

Energy Code
S u p p o r t**Duct Leakage Affidavit (New Construction)**

Permit #: _____

House address or lot number: _____

City: _____

Zip: _____

Cond. Floor Area (ft²): _____

Source (circle one): Plans Estimated Measured

☐ Duct tightness testing is not required. The total leakage test is not required for ducts and air handlers located entirely within the building thermal envelope. Ducts located in crawl spaces do not qualify for this exception.

Air Handler in conditioned space? ☐ yes ☐ noAir Handler present during test? ☐ yes ☐ no

Circle Test Method:

Leakage to Outside

Total Leakage

Maximum duct leakage:

Post Construction, total duct leakage: (floor area x .04) = _____ CFM@25 Pa

Post Construction, leakage to outdoors: (floor area x .04) = _____ CFM@25 Pa

Rough-In, total duct leakage with air handler installed: (floor area x .04) = _____ CFM@25 Pa

Rough-In, total duct leakage with air handler not installed: (floor area x .03) = _____ CFM@25 Pa

Test Result: _____ CFM@25Pa

Ring (circle one if applicable):

Open

1

2

3

Duct Tester Location: _____ Pressure Tap Location: _____

I certify that these duct leakage rates are accurate and determined using standard duct testing protocol.

Company Name: _____ Technician: _____

Technician Signature: _____

Date: _____

Phone Number: _____

Energy Code
*S u p p o r t***WASHINGTON STATE UNIVERSITY**
EXTENSION ENERGY PROGRAM**Duct Leakage Test Results (Existing Construction)**

Permit #: _____

House address or lot number: _____

City: _____ Zip: _____

Cond. Floor Area (ft²): _____☐ Duct tightness testing is not required for this residence per exceptions listed at the end of this document**Test Result:** _____ CFM@25Pa

Ring (circle one): Open 1 2 3

Duct Tester Location: _____

Pressure Tap Location: _____

I certify that these duct leakage rates are accurate and determined using standard duct testing protocol

Company Name: _____

Duct Testing Technician: _____

Technician Signature: _____ Date: _____

Phone Number: _____

Washington State Energy Code Reference:

R101.4.3.1 Mechanical Systems: When a space-conditioning system is altered by the installation or replacement of space-conditioning equipment (including replacement of the air handler, outdoor condensing unit of a split system air conditioner or heat pump, cooling or heating coil, or the furnace heat exchanger), the duct system that is connected to the new or replacement space-conditioning equipment shall be tested as specified in RS-33. The test results shall be provided to the building official and the homeowner.

Exceptions:

1. Duct systems that are documented to have been previously sealed as confirmed through field verification and diagnostic testing in accordance with procedures in RS-33.
2. Ducts with less than 40 linear feet in unconditioned spaces.
3. Existing duct systems constructed, insulated or sealed with asbestos.
4. Additions of less than 750 square feet.

Certificate (Electronic version available at: http://www.energy.wsu.edu/Documents/WSEC-2012-Avery-6878_4_Per_Sheet.pdf)

A permanent certificate shall be posted within three feet of the electrical distribution panel. The certificate shall be completed by the builder or registered design professional and include all of the information as follows:

2012 WSEC Residential Energy Compliance Certificate	Property Address: _____		
	Conditioned Floor Area _____		Date: ____/____/____
	Builder or registered design professional : _____		
	Signature: _____		
	R-Values		
	Ceiling:	Vaulted R-_____	Floors: Over unconditioned space R-_____
		Attic R-_____	Slab on grade floor R-_____
	Walls:	Above grade R-_____	Doors: _____ R-_____
		Below, int. R-_____	_____ R-_____
		Below, ext. R-_____	_____ R-_____
	U-Factors and SHGC		
	NRFC rating (or)	Windows U-_____	SHGC- N/A
	Default rating (Appendix A WSEC 2012)	Skylights U-_____	SHGC- N/A
	Table 406.2 Option(s) _____		Total 406.2 Credits _____
	Heating, Cooling & Domestic Hot Water		
System	Type	Efficiency	
Heating			
Cooling			
DHW			
Duct & Building Air Leakage			
All ducts & HVAC in conditioned space (yes / no)		Insulation R-_____	
Air handler present (yes / no)			
Test Target _____	CFM@25Pa	Test Result _____ CFM@25Pa	
Building air leakage target: $ACH_{50} < 5.0$ - Tested leakage: $ACH_{50} =$ _____			
Onsite Renewable Energy Electric Power System			
System type: _____		Rated annual generation _____ Kwh	